REMARKS

In paragraphs 2 and 4 of the Action, claims 29-35, 37-39, 41-50, 52-54 and 56-58 were rejected by Mountsier et al., Moslehi and Sexton. In view of the rejections, the subject matter of claim 35 has been incorporated into claim 33, and claims 29-32, 35, 37-40, 44-47, 50 and 52-54 have been cancelled. The applicants have the following opinion.

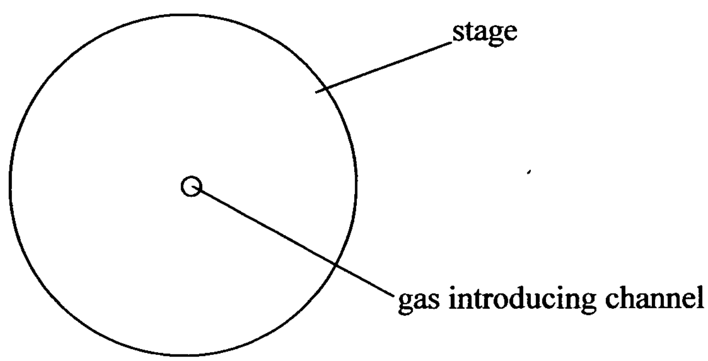
Claim 33 now amended has the features a) radial concaves extend from the center of the stage, b) all of the gas introducing channels communicate with the gas-diffusion concaves at positions off the center of the stage, and c) each lift pin is disposed in each gas introducing channel. These features have not been evaluated properly by the examiner in the previous actions.

In regard to feature a), in the structure where the radial concaves as the gas-diffusion concaves extend from the center of the stage, the gas diffuses sufficiently to the center. Contrarily, in case the radial concaves do not extend from the center of the stage, the gas does not diffuse sufficiently to an area close to the center or "center area", resulting in that heat exchange in the center area is made insufficient. In cooling, for example, the stage is not cooled sufficiently at the center area.

In regard to features b) and c), as understood, a communication position of a gas introducing channel with a gas diffusion concave makes an opening. As for a lift pin, a hole or lift pin hole is provided in the stage for housing the lift pin. These openings are formed in the areas where the stage has no surface facing the object. In this sense, heat exchange between the stage and the object would decrease at the openings. Therefore, the size and number of the openings should be as small as possible. If a large opening is provided or many openings are provided, the problem that temperature of the chucked object is

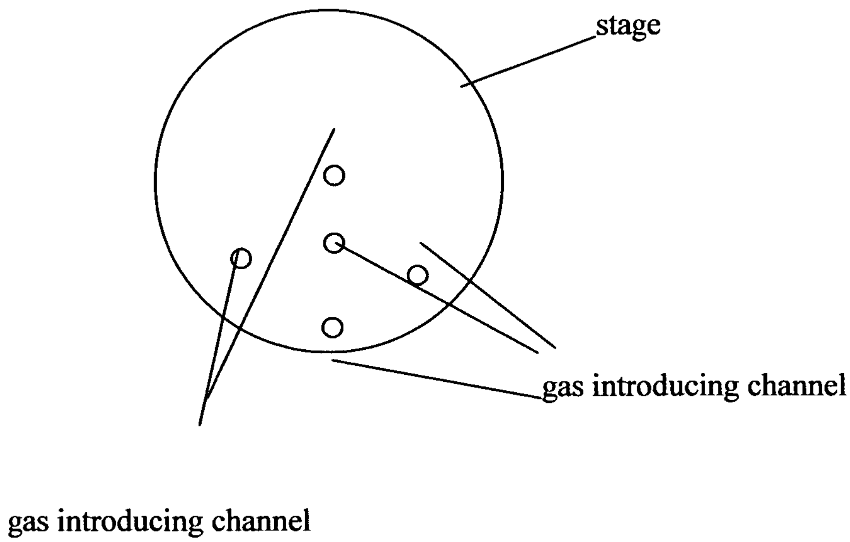
non-uniform might arise. In this sense, the feature c) has the advantage that the number of the openings is minimized.

As shown below (Remarks-fig.1), if a gas introducing channel communicates with gas diffusion concaves at the center of a stage and there are no other gas diffusion channels communicating with gas-diffusion concaves, gas has to diffuse for a distance almost corresponding to the radius of the stage. Therefore, it is required to introduce large quantity of the gas from the gas introducing channel. For this purpose, the opening of the gas introducing channel has to be wider. This brings the problem of non-uniform temperature as explained.



Remarks-fig.1

It is possible to adopt a structure where gas introducing channels communicate with the gas diffusion concaves at positions off the center of the stage in addition to the center position. An example of this type is shown below (Remarks-fig.2). In this structure, the center opening does not need to be enlarged. However, temperature of the object might be non-uniform, because the number of the openings increases. The embodiments disclosed in Mountsier (USP5,810,933) et al. belong to this type. The embodiments disclosed in Moslehi (USP5,936,829) also belong to this type.



Remarks-fig.2

In the structure shown in Remarks-fig. 2, it is possible to provide each lift pin in each gas introducing channel. However, this is not practical. Usually, lift pins are disposed on a circumference coaxial to the stage at an every equal angle. If an additional lift pin is provide at the center, plane balancing of the lift pins would be made much difficult. That is, it would be much difficult to dispose each lift pin so that an object held thereon can take horizontal position. Moreover, another mechanism or unit is often provided along the center axis within the stage. In this case, it would be difficult and impractical to locate a lift pin and its lifting mechanism at the center. The feature b) has the advantage because it does not cause these problems.

In the structure shown in Remarks-fig. 2, it is also possible NOT to provide a lift pin in the center of the gas introducing channel. However, such a gas introducing channel in which no lift pin is housed wastefully makes an opening, and decreasing heat exchange thereat. Conversely, it is possible that a lift pin hole is not commonly used as a gas introducing channel. However, this

would cause a problem in productivity. If a lift pin hole is not used as a gas introducing channel, the introduced gas needs to diffuse to the lift pin hole via the gas diffusion concaves on the stage surface. As a result, it takes much time until the lift pin hole is filled with the gas sufficiently, to cause decrease in productivity. In case the lift-pin hole is used commonly with a gas introducing channel, the productivity decrease is prevented, because the gas is initially (directly) introduced to the lift pin hole, that is, not via the gas diffusion concaves.

As explained above, the features a), b) and c) collaboratively bring the advantage that the object can be chucked horizontally as its temperature is made uniform without decrease of heat exchange at the center area of the stage. Any references do not disclose the combination of the features a), b) and c), nor suggest the synergy brought from collaboration of the features a), b) and c). Therefore, the claim 32 is not obvious from those references.

In the action on May 9, 2005, the examiner rejected the claims by combining Mountsier et al., Moslehi and Sexton et al. However, disclosures in these references are different from each other in their gas-supply structures.

As explained before, the chuck 16 in Moslehi is to convey an uninhibited flow of gas, and comprises the circumferential and radial channels 88, 90 for supporting the gas flow. In Mountsier et al., contrarily, from the description in column 12, lines 5-15, it is understood that an introduced gas is substantially sealed between the WCD (wafer cooling device) and a wafer.

Therefore, there is clear contrast in gas-supply structure between Moslehi and Mountsier et al. In Moslehi, the gas flows uninhibitedly at the backside of the substrate. In Mountsier et al., contrarily, the gas is sealed at the backside of the substrate (wafer).

One skilled in the art would not combine those gas supply structures, because those belong to the different types. In other words, the examiner's recognition that the gas-supply structure in Moslehi is obviously applied to the WCD of Mountsier et al. is not proper.

Claims of the application are patentable over the cited references.

Reconsideration and allowance are earnestly solicited.

Respectfully Submitted,

HAUPTMAN KANESAKA BERNER
PATENT AGENTS, LLP

By ______________________
Manabu Kanesaka
Reg. No. 31,467
Agent for Applicants

1700 Diagonal Road, Suite 310
Alexandria, VA 22314
(703) 519-9785